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Efficient control of gene expression by single step integration of the tetracycline system in transgenic mice.

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Tetracycline-regulated gene expression in eukaryotic cell lines, plants, and transgenic mice has become a powerful tool for the analysis of eukaryotic gene expression and function. The system consists of two plasmids, one encoding the transactivator protein under control of a viral cytomegalovirus promoter, and the second being the tet-operator minimal promoter driving the gene of interest. Here we show that these control elements, when integrated in cis on a single plasmid, allow efficient and tight control of reporter gene expression in vitro and in vivo. Dependent on the route of administration of tetracycline, gene expression can be partially or fully repressed in transgenic mice, whereas removal of the antibiotic induces the reporter gene in various tissues to levels up to 800-fold more than the two-plasmid system. In addition, crossing and analysis of animals transgenic for the individual components of the system are unnecessary, and genetic segregation of the control elements during breeding is prevented.

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